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Hemlock Water Dropwort (*Oenanthe crocata*) Poisoning in Cattle

BY

A. L. WILSON, W. G. JOHNSTON, H. B. McCUSKER,* and C. C. BANNATYNE

Veterinary Investigation Department, West of Scotland Agricultural College, Auchincruive, Ayr

SUMMARY.—1. *Evidence is presented to show that cases of poisoning by hemlock water dropwort* (Oenanthe crocata) *may be much more common than is believed.*

2. *The literature on the subject is reviewed.*

3. *Details of 5 outbreaks in the South-west of Scotland are described.*

4. *Methods of treatment are suggested.*

Introduction

FIVE outbreaks of hemlock water dropwort poisoning have been investigated from this department since 1954. In the same period the Botany Department of the College has received several specimens of the plant for identification from stock-owners presumably because they were associated with the deaths of animals. These facts suggest that this type of poisoning may be relatively common, consequently this paper has been prepared to review the literature and record the details of our cases.

Review of Literature

The poisonous properties of hemlock water dropwort for humans have been known for many years. Thus Vaughan (1722) described symptoms in man caused by eating the roots while Linnaeus, according to Skarman (1927), observed the toxic effects of the plant in Sweden in 1746. Orfila (1821) quotes a number of cases of poisoning that occurred during the 17th and 18th centuries and Baume (1861), described a fatal case in an asylum inmate. Bloc (1873), Demoor (1896, 1897) and Witthaus (1911) reported 124, 218, and 159 cases respectively. More recent cases in medical litetature have been recorded by Thomas (1937), McGrath (1937), and Locket (1957).

Cases in animals have been described by Finlay Dun (1882) who investigated an outbreak in Ireland in which 43 cattle out of 74 died after eating the fresh leaves of the plant. Hoare (1888) reported an outbreak in which 2 cattle died after eating roots that were left in a field after a flood. Cornevin (1893) states that *Oe. crocata* causes poisoning in animals every year.

In the report of the consulting botanist in the *Jnl. Roy. Agric. Soc.* (1898) there is a record of cows and sheep dying on a farm near Bristol after eating the roots. Holmes (1902) regards hemlock water dropwort as the most dangerous and virulently poisonous of all the British native plants. This opinion is supported by Fenton and Robertson (1931) who state that more cases of poisoning in stock are due to this plant than to any other. Gillam (1906), in a paper to the Western Counties Veterinary Medical Association quoted a foreign case in which sheep died after eating roots that were cleaned out of a ditch. In the discussion following Gillam's paper Bovett mentioned a fatal outbreak involving 2 stirks while Dunstan said that poisoning by *Oe. crocata* was rather frequent and described an outbreak in which several cattle died after eating the roots that were exposed by the plough. Milne (1945) described a fatal case in a gelding, and Crowley (1949) recorded 2 outbreaks in cattle in each of which 3 animals died. Descriptions of the plant and the symptoms of poisoning are given by Long (1924), Nicholson (1947), Forsyth (1954), and Garner (1957).

Although the poisonous properties of the plant

* Now at Department of Veterinary Pathology, University of Glasgow Veterinary School.

have been known for so long very little work has been carried out on its chemistry and it is only recently that the toxic factor has been isolated and studied. Cormerais and Pihan-Dufeillay (1830) found that the factor is contained in a resinoid material in the root while Boehm (1876) considered that the convulsant properties of the poison were similar to those of picrotoxin. Boehm's opinion was supported later by Grollman and Slaughter (1947). Pohl (1894) recovered a neutral resinous substance from the root and called it Oenanthetoxin while Tutin (1911) isolated several non-toxic substances from an ethyl alcoholic extract of the root but found also that the poisonous properties were associated with the ether soluble resin. He considered that the neutral resin recovered by Pohl was not a pure substance. Clarke, Kidder, and Robertson (1949) were the first workers to obtain pure crystalline oenanthetoxin and Anet, Lythgoe, Silk, and Trippett (1953) investigated its chemical structure and found it to be a highly unsaturated alcohol to which they assigned the formula C17H2202. Grundy and Howarth (1956) studied the pharmacology of oenanthetoxin and demonstrated *inter alia* that rabbits and cats given a lethal dose could be saved by a prompt injection of pentobarbitone.

Cases in the South-west of Scotland

Outbreak No. 1

This occurred in Wigtownshire in April, 1954, during a period of very dry windy weather which greatly reduced the nutritional value of the grass. Five Ayrshire heifers were found dead in a wooded, boggy area to which they had gained access by breaking through the boundary fence. The only significant finding at *post-mortem* examination was the presence of pieces of undigested *Oenanthe crocata* root in the rumen of each animal. Many hemlock water dropwort plants, some with exposed and broken roots, were found near the dead cattle and it was concluded that they had broken into the boggy area to obtain the more succulent grass growing under the trees.

Outbreak No. 2

This involved a Highland stirk that died in March, 1955, on a hill sheep farm on the east shore of Loch Fyne in Argyllshire. The animal had been observed by workers in the farm steading making its way downhill along the side of a hill burn and about half an hour later it staggered into the farmyard bellowing, foaming at the mouth, and breathing very deeply. Before anyone could reach it the stirk fell to the ground and died in convulsions. *Post-mortem* examination revealed several pieces of undigested *Oenanthe* root in the rumen. The stirk's path downhill was retraced and several roots were found in a shallow, pebbly part of the burn that was used by the animals as a crossing place. Clumps of hemlock water dropwort plants were found further upstream in a place normally inaccessible to the cattle but there was plenty of evidence that the sides of the burn had been eroded during a spate that had occurred a few days previously. This had probably loosened the plants which had been washed down to the crossing place where they were left by the subsiding flood.

Outbreak No. 3

Nineteen Ayrshire heifers were moved on to an island in the mouth of the River Dee in Kirkcudbrightshire in March, 1956. In the following month 3 heifers died over a 3-day period without having been seen ill and once again pieces of undigested *Oenanthe* root were found in the rumen of each at *post-mortem* examination. There were no hemlock water dropwort plants growing in the fields but many clumps were found on the river banks which were freely accessible to the cattle because of the broken down state of the fences. Several of the plants had bruised exposed roots indicating that they had been eaten recently by the cattle. A considerable volume of water is released daily into the river by a hydro-electricity station and the force of the water had washed away the soil from round the roots thus exposing them to the cattle.

Outbreak No. 4

This was the most serious outbreak and occurred in February, 1957, in Dunbartonshire in a field on the estuary of the River Clyde two days after a violent storm of gale force south-westerly winds that caused exceptionally high tides. A group of 34 2-year-old heifers and a 2-year-old Ayrshire bull were grazing in the field and 10 heifers and the bull died within a period of 24 hours. Pieces of hemlock water dropwort root were recovered from the rumen contents at *post-mortem* examination, consequently the field was searched for the growing plants. Large numbers were found near the edge of the water well above the normal high tide mark but a line of washed-up tidal debris indicated that the plants must have been submerged during the storm. A considerable number of roots were lying free on the shingle and all that was left of some was the growing stem about one inch high. There was no grass growing between the plants and the sea and it was concluded that the turbulence in the water during the storm had washed away the sand and gravel from the roots which were left exposed by the receding tide. The 24 surviving animals were removed from the field and although some of them remained apathetic for a few days they recovered completely without treatment.

Outbreak No. 5

This occurred on the Island of Jura in Argyllshire under similar circumstances and as a result of the same storm as in the previous outbreak. A black polled Irish cow was found dead within 100 yards of the sea and portions of *Oenanthe* root were recovered from the rumen at *post-mortem* examination. The storm had caused the tide to rise to a height unknown during the previous 20 years and the water had washed the soil away from the roots of the plants then deposited them well up the field where they were easily picked up by the cow.

The Hemlock Water Dropwort Plant

Oenanthe crocata is a stout, umbelliferous, perennial weed commonly found in marshy places, along

the shores of the Scottish sea lochs, the banks of streams, and in ditches. It prefers a soil of low *p*H and grows to a height of between 3 and 5 feet. The leaves are compound, much divided, dark green in colour, and resemble the leaves of the celery and carrot plants. Small white flowers appear in June or July and are carried on terminal compound umbels with from 12 to 40 rays about 2 inches long. The stem is strongly ridged and hollow and the root consists of pale yellow tubers not unlike those of the ordinary garden dahlia. All parts of the plant are poisonous but the roots are the most toxic, and Cornevin (1893) states that the toxic dose of fresh roots for cattle is 1.25 lb. per 1,000 lb. per bodyweight. The oenanthetoxin is not destroyed by drying and submersion of the roots in water for several days does not appear to reduce its potency. A juice with a characteristic celery-like odour can be squeezed out of the resin canals in the stem and roots of the fresh plant and even from pieces of root recovered from the rumen at *post-mortem* examination. This juice may turn yellow on exposure to air and is alleged to have a powerful irritant action on the skin.

Symptoms

These have been described fully by Hoare (1888) and are identical with the symptoms shown by the Highland stirk in outbreak No. 2. Oenanthetoxin is a potent, convulsant poison, consequently the symptoms are excessive salivation causing foaming at the mouth, widely dilated nostrils, accelerated breathing, abdominal pain, loud bellowing, bloodshot eyes with largely dilated pupils, rapid weak pulse, staggering gait, running round in circles, convulsions, and death. Hoare also described a gradual loss of power in the hind limbs while Nicholson (1947) states that the paralysis may persist. These symptoms have not, however, been observed in any of our cases.

Treatment

The quantity of roots available in most outbreaks is usually many times the poisonous dose, consequently it is unlikely that cases will be seen early enough to allow treatment to be carried out. Nevertheless, when a herd of cattle has had access to the plant all stages of the disease may be encountered and preventive treatment of the survivors should be attempted. Locket (1957) states that picrotoxin—a group containing oenanthetoxin—is rapidly detoxicated in the human body and the effects of even large doses soon wear off provided the patient can be kept warm and breathing. This seems to be substantiated in animals by the experiences of Hoare (1888) who successfully treated a cow showing the typical symptoms with warm water enemas, opium, and linseed oil, while 5 other cows in the same outbreak recovered after treatment with Epsom salts. The finds of Grundy and Howarth (1956) who demonstrated that rabbits and cats given a lethal dose of oenanthetoxin could be saved by a prompt injection of pentobarbitone are important since they postulate treatment by the induction of sedation. In this connexion Forsyth (1954) mentions the use of chloroform followed by nembutal intravenously in sheep. In an outbreak involving cattle, therefore, the survivors should be brought indoors and kept warm in the hope that the oenanthetoxin will be neutralised before the animal dies. Symptomatic treatment with chloral hydrate alone or combined with magnesium sulphate could be given to any new cases that occur.

Diagnosis

Cases are usually reported under the Anthrax Order since the normal history is that one or more animals were found dead without having been seen ill previously There are no pathognomonic lesions at *post-mortem* examination and hyperaemia of the buccal and rumenal mucosae may be the only visible abnormalities. The intensity of the hyperaemia is proportionate to the amount of roots consumed probably because of the irritant action of the plant juices. Hoare (1888) found congestion of the meningeal and cerebral vessels but these lesions would normally be present in cases of poisoning caused by convulsants. Immediately the rumen is opened the sharp, characteristic, celery-like odour of the bruised plant can usually be detected and more especially if a considerable quantity of roots has been eaten. The rumen contents must be searched thoroughly for pieces of the plant and in our experience they are never found beyond the rumen. The celery-like odour can easily be appreciated by cutting the pieces of plant tissue removed from the rumen cleanly with a knife and expressing the juice from the resin canals with the fingers. Since other poisonous plants may be involved final diagnosis should only be made after submitting all the suspected material to a botanist for analysis.

Discussion

The 5 outbreaks described above were caused by the roots of *Oenanthe crocata* and occurred during the early part of the year when the only part of the plant visible above the ground is the short tip of the stem. Since it is unlikely that cattle could eat this short stem some precipitating factor whereby the roots are exposed should be looked for in every outbreak. In outbreak No. 4, for instance, cattle had grazed the field for many years with impunity but in February, 1957, there occurred for the first time a combination of gale-force winds, high tides, and exceptional turbulence in the sea which eroded the soil away from the roots and left them lying exposed. Drought and poor grazing in early spring, as in outbreak No. 1, may also compel the cattle to seek more nutritious grass in marshy places in many of which *Oenanthe crocata* grows in abundance. Outbreaks may also follow ploughing as mentioned by Dunstan (1906), cleaning ditches (Gillam, 1906), and indeed any activity that brings the roots to the surface of the ground. Occasionally too, roots may be washed downstream for some considerable distance as in outbreak No. 2 or may even be left lying in a field after a flood as mentioned by Hoare (1888) and Crowley (1949). These two latter cases emphasise the important point that the roots are still poisonous after submersion in water for several days. The roots, according to Cornevin (1893), are attractive to cattle because of their parsnip-like appearance and also because of

their taste and odour. In every outbreak a serious attempt should be made to find the place where the plants are growing so that it may be fenced off or dug out to prevent further deaths. Although there was no opportunity to treat cases in any of the outbreaks described above, recent work by Grundy and Howarth (1956) suggests that treatment by induced sedation might be possible. The oenanthetoxin, however, acts so rapidly that it is extremely doubtful if treatment of affected cases would be successful; consequently, attention should be devoted to the prevention of symptoms in the survivors by the use of anticonvulsants.

Acknowledgment.—Thanks are due to Dr. W. W. Fletcher and Mr. D. J. Martin of the Botany Department of the West of Scotland Agricultural College for identifying the plant material recovered at *post-mortem* examination.

References

ANET, E., LYTHGOE, B., SILK, M. H., & TRIPPETT, S. (1953). *J. Chem. Soc.* **62.** 309.
BAUME (1861). *Archiv. des Mal. Mentales. No. 3.* Cited in *Edin. Vet. Rev.* 1862. **4.** 704.
BLOC, P. (1873), cited by Pohl, J. (1894). *Arch. expt. Path. Pharmak.* **34.** 259.
BOLHM, R. (1876). *Ibid.* **5.** 294.
BOVETT, E. W. (1906). *Vet. Rec.* **19.** 88.
CLARKE, E. G. C., KIDDER, D. E., & ROBERTSON, W. D. (1949). *J. Pharm. Pharmacol.* **1.** 377.
CORMERAIS & PIHAN-DUFEILLAY (1830). *J. Chim. med.* **6.** 459.
CORNEVIN, C. (1893). "Des Plantes Vénéneuses." Paris.
CROWLEY, P. (1949). *Jnl. Dept. Agric. Ireland.*
DEMOOR, C. H. (1896). *J. belge Homeop.* 3, 1, 75, 139, 199, 263, 326.
——. (1897). *Ibid.* 4, 1, 71, 147, 285.
DUN, F. (1882). "Veterinary Medicines, Their Actions and Uses." 6th ed. David Douglas, Edinburgh.
DUNSTAN, J. (1906). *Vet. Rec.* **19.** 88.
FENTON, E. W., & ROBERTSON, E. D. S. (1951). Bull. No. 4. New Series. Edinburgh and East of Scotland Coll. of Agric.
FORSYTH, A. A. (1954). *British Poisonous Plants. Bull. 161.* Min. of Agric. and Fisheries, London.
GARNER, R. J. (1957). "Veterinary Toxicology." Baillière, Tindall & Cox, London.
GILLAM, W. G. (1906). *Vet. Rec.* **19.** 88.
GROLLMAN, A., & SLAUGHTER, D. (1947). "Cushny's Pharmacology and Therapeutics." 13th ed. Churchill, London.
GRUNDY, H. F., & HOWARTH, F. (1956). *Brit. J. Pharm. Chem.* **11.** 225.
HOARE, E. W. (1888). *Vet. Jnl.* **26.** 126.
HOLMES (1902). *Pharm. J.* **14.** 431.
Jnl. Roy. Agric. Soc. (1898). 3rd series. **9.** 561.
LOCKET, S. (1957). "Clinical Toxicology." Henry Kimpton, London.
LONG, H. C. (1924). "Plants Poisonous to Livestock." 2nd ed. University Press, Cambridge.
MCGRATH, J. (1937). *Irish J. med. Sci.* 309.
MILNE, J. (1945). *Vet. Rec.* **57.** 30.
NICHOLSON, J. A. (1947). "Lander's Veterinary Toxicology." 3rd ed. Baillière, Tindall & Cox, London.
ORFILA, M. J. B. (1821). "A General System of Toxicology." F. Cox & Son, London.
POHL, J. (1894). *Arch. expt. path. Pharmak.* **34.** 259.
SKARMAN (1927). *Svensk. bot. Tidskr.* **21**(2). 171.
THOMAS (1937). *Brit. med. J.* 1,309.
TUTIN (1911). *Pharm. J.* **33.** 296.
VAUGHAN, E. (1722). *Phil. Trans. R. Soc.* **2.** 641.
WITTHAUS (1911). "Manual of Toxicology." 932. New York.

Case Report on a Dislocation of the Fetlock with Extrusion of the Cannon Bone in the Mare

BY

D. M. BERRY

Lydford P.O., St. Ann, Jamaica, B.W.I.

SUMMARY.—A case of dislocation of the fetlock in the mare is described, in which the integrity of the blood vessels permitted an operation.

ON April 23rd, 1956, an 8-year-old polo pony mare at grass was found with complete dislocation of the near fore fetlock. When first seen, the mare was standing quietly, with the distal end of the cannon bone extruding 4½ inches through a 5-inch skin wound on the anteromedial aspect of the fetlock. A second skin wound 3 inches long was seen on the anterolateral aspect of the fetlock. Very little haemorrhage was observed from the wounds which were liberally covered with mud. The foot appeared to be attached to the rest of the leg by skin and flexor tendons only, but closer examination revealed that the blood supply to the foot was intact and from the appearance of the tissues the accident had occurred approximately 4 hours prior to being called.

Anaesthetic

Chloral was administered by stomach tube and the mare was cast on the near side.

Additional high plantar nerve block was effected with Lignocaine.*

Procedure

The whole operational field was grossly contaminated with earth, particularly the distal articular surface of the cannon bone and the proximal articular surface of the first phalanx, which was filled with clotted blood and earth.

Thorough cleansing of the whole site was effected. Chlortetracycline† ointment was used as a lubricant and temporary joint fluid, and the joint was restored. Damage to the ruptured joint capsule, collateral ligaments and suspensory ligament was too extensive to permit effective surgical repair, and so fascial and skin sutures alone closed the wounds.

The whole leg from the middle of the forearm to the hoof was enclosed in a three-quarter plaster cast which was secured with sticking plaster‡.

The mare was given tetanus antitoxin, penicillin and streptomycin and pethidine.

The operation took place in a field in which the mare was found. Owing to the lack of transport facilities, when she had recovered from the chloral, she was obliged to walk one mile to the nearest available loose-box.

* Xylotox.

† Aureomycin.

‡ Elastoplast.

D. M. BERRY.—CASE REPORT ON A DISLOCATION OF THE FETLOCK WITH EXTRUSION OF THE CANNON BONE IN THE MARE

L. C. VAUGHAN.—INJURIES TO THE TIBIO-TARSAL JOINT IN THE DOG AND CAT

FIG. 1.—Anterior-posterior radiograph of tibio-tarsal joint in Case 1. Note separation of distal tibial epiphysis and fracture distal fibula. (Enlarged from the original X-ray plate.)

FIG. 2.—Case 1, three weeks after closed reduction of fractures. (Enlarged from the original X-ray plate.)

FIG. 3.—Lateral radiograph of tibio-tarsal joint in Case 2. Note anterior luxation of tibia and fracture distal fibula.

FIG. 4.—Case 2, three weeks after closed reduction of luxation.

On the day following the operation, the mare looked comfortable and her temperature was 102.1° F. The three sound legs were bandaged. The mare was put on a laxative diet which she ate readily.

On this day and daily afterwards for one week the mare was given penicillin and streptomycin intramuscularly together with pethidine. During this time the temperature returned to normal, and the mare continued to eat, drink and dung normally.

The plaster was removed 8 days after the operation. No purulent discharge was observed. The wounds were granulating well and the stitches were removed. There were no sinuses or fistulae. The leg was reset in a three-quarter plaster and Elastoplast. Although she had by this time lost some weight, the rapid loss of flesh normally associated with acutely painful conditions in the horse was not seen.

In the two succeeding months the plaster was changed every 10 to 14 days. During this time the flexor tendons were beginning to flex the joint and a metal corrective splint was applied to maintain the flexor tendons in the fullest possible extension.

In the third month, exercise, starting with a quarter-of-an-hour's hobbling and leading up to 2 hours grazing in the paddock, was achieved. At this time the mare was eating heartily and appeared to be in moderate condition; the improvement in the gait accompanied the improvement in condition.

One week after she had virtually completed her convalescence she was found cast, and had evidently been cast and unable to get up since the previous evening. During this period she had inflicted severe damage on herself and appeared to be in a state of coma. There was no improvement 24 hours afterwards and the mare was shot.

Discussion

On *post-mortem* examination of the leg, any complications due to the recently-healed injury could be ruled out, the general health of the limb being unaffected.

A detailed dissection of the leg showed that the whole fetlock joint was enveloped in a very thick "bandage" of fibrous tissue in which were involved the extensor tendons and the suspensory ligament. The flexor tendons were intact. The fetlock joint surfaces showed a total loss of articular cartilage, which had been replaced by fibrous tissue suggesting the gradual development of ankylosis. (See Plate I.)

From the description of the dissection and an examination of the leg *post mortem*, it would seem that sufficient repair of the leg had taken place to enable the mare to be used for breeding (barring a further accident which occurred in this case), although the disrupted function of the joint and tendons would preclude using the mare for other work.

Clinical Notes

INJURIES TO THE TIBIO-TARSAL JOINT IN THE DOG AND CAT

L. C. Vaughan

Department of Surgery, Royal Veterinary College, Streatley, Berks

Joshua (1957) has published the case records of two cats with unusual hock injuries. In one cat there was a separation of the distal tibial epiphysis while the other suffered a luxation of the tibio-tarsal joint. Elsewhere in veterinary literature exceedingly little information is available concerning the occurrence of such orthopaedic conditions in small animals. In "Hobday's Surgical Diseases of the Dog and Cat" (McCunn, 1953) there appears a radiograph which is said to show a luxation of the "true hock joint" in a dog but no reference is made to this subject in the text. The treatment of a Greyhound with a luxation of the tibio-tarsal joint is described in "Dollar's Veterinary Surgery" (O'Connor, 1956); in this case reduction of the luxation was only possible after section of the Achilles tendon.

Within recent months a cat with a separation of the distal tibial epiphysis and a dog with a luxation of the tibio-tarsal joint have been treated and the protocols of these cases appear below. In the main they have been presented because the method of treatment differs from those similar cases described by Joshua. Whereas the latter author had to resort to ingenious surgical methods of repair, here it was possible to use the closed reduction method.

Case 1: Separation of the distal tibial epiphysis in a 1-year-old neutered male cat.

Clinical Features: The cat was seen to be lame in the left hind leg and the owner thought it had been hit by a motor car. The limb below the hock joint was deviated laterally and the distal end of the tibia could be palpated subcutaneously. A tentative diagnosis of a tibio-tarsal luxation was negatived by X-ray examination. The distal extremity of the fibula was also fractured (Fig. 1).

Treatment: Under ether anaesthesia the tibial shaft was manipulated into its normal position and a plaster cast applied from just above the foot to the upper tibial region, with the hock joint in semi-extension. The cast was removed 3 weeks later at which time the fractures had healed (Fig. 2). Complete restoration of limb function soon followed.

Case 2: Dislocation of the tibio-tarsal articulation in a 7-year-old male Terrier

Clinical Features: When the dog was presented for examination it was reported that the injury to its right hind leg had occurred the previous day when the dog was hit by a car. There was extensive subcutaneous oedema surrounding the tibio-tarsal joint and the limb was out of action. On palpation it was at once evident that the tibia was displaced anteriorly. The tarsus could be bent laterally but flexion and extension of the joint was very restricted. The diagnosis was confirmed by radiography. The distal

extremity of the fibula was fractured (Fig. 3).

Treatment: The dislocation was reduced without much difficulty under general anaesthesia and a plaster cast applied as in Case 1. The cast was removed 3 weeks later when it was found that flexion was somewhat restricted but otherwise the joint functioned normally (Fig. 4).

Acknowledgments.—Grateful thanks are due to Professor C. Formston, F.R.C.V.S., for advice and encouragement, and to E. F. Lewis, M.R.C.V.S., for the photographs.

References

JOSHUA, J. O. (1957). *Vet. Rec.* **69**, 929.
McCUNN, J. (1953). "Hobday's Surgical Diseases of the Dog and Cat." 6th ed. London: Baillière, Tindall & Cox.
O'CONNOR, J. J. (1956). "Dollar's Veterinary Surgery." 4th ed. (reprinted). London: Baillière, Tindall & Cox.

RING WOMB IN TWO EWES

J. P. Pickering

Hexham, Northumberland

Introduction: The writer was twice called in within a period of 7 days to examine two Suffolk cross ewes, the owner saying that they were suspected to be lambing but were making no effort. In both cases the cervix had dilated sufficiently to allow one finger to be inserted into the womb, and in both cases a shred of foetal membrane was seen to be protruding. These membranes had ruptured.

Diagnosis: A diagnosis was made of atony of the uterus and failure of the cervix to dilate—what is popularly known as "ring womb."

Treatment: Each ewe was injected subcutaneously with 150 ml. of 20 per cent. calcium borogluconate solution, and intramuscularly with 4 c.c. pituitary (posterior lobe) extract, 10 units per ml. and 0.5 c.c. stilboestrol diproprionate, 10 mg. per ml. Both ewes delivered live lambs within 12 hours of treatment and progressed normally.

Conclusion. Only these two cases are quoted because they occurred on the same farm within a week. Several such cases were treated subsequently with equally good results. It is of the greatest importance that such cases should be detected early if a satisfactory outcome is to be achieved.

DETECTION OF MASTITIS

A further development of the Pye Milcometer was shown at the Royal Show. This small portable electrical instrument is intended for the detection of mastitis in milk. Originally, a special probe had to be dipped into the milk to take the reading.

The manufacturers have designed an attachment for incorporating in the milk-flow line of parlours, the reading still being taken on the same meter.

Despite the fact that the new attachment is basically a scientific piece of apparatus, it can be brushed, cleaned, and sterilised without danger of damage.

The Effect of Analeptics on Pentobarbitone Anaesthesia in the Cat

BY

J. SANFORD

Department of Pharmacology and General Therapeutics, University of Liverpool

SUMMARY.—1. Cats anaesthetised with pentobarbitone were given sodium bemegride which restored reflex responses but did not abolish the recovery period, although this was reduced to a significant extent. It is concluded that the administration of a single dose of sodium bemegride to anaesthetised cats is not a useful routine procedure.

2. Sodium bemegride is a more potent analeptic than leptazol. Its analeptic action may be of practical value in the treatment of cats which have received an overdose of barbiturate.

Introduction

PENTOBARBITONE is used extensively as an anaesthetic agent for cats and does not give rise to serious toxic effects. The use of this agent has been discussed in detail by Wright (1952). The chief disadvantage associated with pentobarbitone is that recovery from anaesthesia is delayed and in some instances may be prolonged for up to 24 hours.

There are obvious advantages in reducing this recovery period by the use of an antagonist to pentobarbitone, and Shaw *et al.* (1954) reported that bemegride (β-methyl-β-ethylglutarimide)* antagonised pentobarbitone in a number of species, including the cat. These authors found that intraperitoneal injection of bemegride in cats caused arousal to a state of reflex activity, but did not bring about a return to consciousness. The action of bemegride in cats anaesthetised by pentobarbitone has been studied more recently by Macfarlane and Bentley (1957) whose results were published during the course of the present experiments.

Attempts were therefore made to assess the value of bemegride as an analeptic in cats anaesthetised with pentobarbitone, and to compare the effects with those produced by leptazol.

Method

Young adult male and female cats were used for these tests. They were fed on milk and a mixture of proprietary cat foods, but on the days on which the tests were carried out they were given milk only, in order to reduce the risk of vomiting during anaesthesia. The room in which the tests were performed was maintained at a constant temperature. A number of studies were carried out using a cross-over test in which the duration of anaesthesia and the recovery time of cats anaesthetised by pentobarbitone were compared with those which followed when either bemegride or leptazol were subsequently administered. There was an interval of at least 7 days between successive tests on the same animal.

*Megimide : Nicholas Products Ltd.

All drugs were administered by slow intravenous injection into either the cephalic or the saphenous vein. Each cat was anaesthetised by slow injection of pentobarbitone sodium solution, over a period of 5 to 7 minutes, until a standard stage of deep anaesthesia had been attained, namely the loss of palpebral, corneal and fore and hind pedal reflex responses. In all tests it was possible to obtain the loss of all these reflex responses without causing respiratory failure.

The analeptic drug was given 15 minutes after completion of administration of the anaesthetic. Records were made of:—

(a) the time taken for the return of the reflex responses decribed above (duration of full anaesthesia).
(b) the time at which the cat raised its head in a co-ordinated manner.
(c) the time at which the cat was able to stand (recovery time).

In the control tests it was noted that corneal and pedal reflex responses returned before the palpebral response, but duration of full anaesthesia was regarded as the time taken for the return of all three responses. The ability of a cat to stand did not imply that the animal had recovered completely.

Drugs

Pentobarbitone sodium solution 60 mg. per ml. (Abbott's veterinary "Nembutal"),

Leptazol solution 20 mg. per ml. (B.D.H. 10 per cent. solution diluted in sterile water),

Bemegride solution 5 mg. per ml. (Nicholas Products Ltd. "Megimide"),

Sodium bemegride solution 25 mg. per ml. (Nicholas Products Ltd.).

The solution of sodium bemegride was prepared by dissolving the solid compound in sterile water and was not made up until required for use. The solution so obtained was markedly alkaline (*p*H 11.5) and care was taken to ensure that peri-venous injection did not occur.

Results

Preliminary Observations with Bemegride and Sodium Bemegride

Six cats were injected with pentobarbitone solution until deep anaesthesia had been produced. Fifteen minutes later, 3 of these cats were given bemegride solution until the reflex responses had returned. At this stage, the cats responded to painful stimuli, but the time taken to recover from the anaesthetic was not less than after pentobarbitone alone. The volumes of bemegride solution injected were 30, 24 and 18 ml. In view of the practical difficulties involved in administering such large volumes of solution, it was considered that this preparation was unsuitable for use in cats in clinical practice.

The other 3 cats were therefore injected with the more concentrated solution of sodium bemegride, and although an immediate persistent return of reflex response was noted, the recovery time was not reduced compared with that of the animals given pentobarbitone alone. The doses of pentobarbitone and sodium bemegride are shown in Table I which indicates that the dose ratio of the analeptic to the anaesthetic drug was 0.68. Since Shaw (1955) has suggested that the antagonistic action of bemegride to barbiturates might depend on similarities in the molecular structure of these compounds, it was considered that the effective dose of analeptic might be a function of the relative molecular weight of these two compounds. The ratio of the molecular weights of sodium bemegride and pentobarbitone sodium is 0.71. This ratio appeared to be closely similar to that of 0.68 observed in the preliminary experiments. In subsequent tests sodium bemegride and sodium pentobarbitone were administered in equimolecular doses.

TABLE I
TERMINATION OF ANAESTHESIA BY SODIUM BEMEGRIDE

	Dose of pentobarbitone mg. per kg.	Dose of sodium bemegride mg. per kg.
	31·6	26·3
	34·3	21·4
	40·7	25·3
Mean	35·5	24·3

Effect of Sodium Bemegride and of Leptazol

The effect produced by giving an equimolecular dose of sodium bemegride to cats anaesthetised by pentobarbitone was compared with that produced by an equimolecular dose of leptazol.

Comparative tests were carried out in 10 cats, each of which was anaesthetised on three occasions at weekly intervals. Experiments were performed as follows:—

(a) Control observation. Anaesthesia with pentobarbitone sodium alone.
(b) Anaesthesia with pentobarbitone sodium followed 15 minutes later by an equimolecular dose of sodium bemegride.
(c) Anaesthesia with pentobarbitone sodium followed 15 minutes later by:—
  i. an equimolecular dose of leptazol (4 cats)
  ii. a dose of leptazol sufficient to produce a return of reflex responses (6 cats).

The results obtained are summarised in Table II (overleaf).

When the cats were given sodium bemegride the recovery times were shorter than after pentobarbitone alone. The difference in recovery times was calculated for each cat and the mean and standard error of these differences for 10 cats was 1.725 $\pm$0.724 hours. When tested by the null hypothesis this difference was significantly greater than zero ($P < 0.05$).

In 2 of the first 4 cats tested, an equimolecular dose of leptazol was insufficient to produce a return of reflex responses. Of these, one was fully anaesthetised for 90 minutes, whilst the other showed a pedal reflex immediately after injection, but subsequently relapsed into deep anaesthesia. In this cat, pedal, corneal and palpebral reflex responses did not return

TABLE II

EFFECT OF SODIUM BEMEGRIDE AND OF LEPTAZOL ON PENTOBARBITONE ANAESTHESIA IN 6 CATS

		Na. Pentobarbitone control	Na. Bemegride	Leptazol
Cat 1. (1·8 kg.)	Dose mg. per kg.	36	25·2	25·9
	Duration of anaesthesia mins.	105	—	—
	Return of ability to to raise head hrs.	2·25	4·0	4·0
	Recovery time hrs.	6·75	5·0	5·5
Cat 2. (4·3 kg.)	Dose mg. per kg.	28	19·8	37·7
	Duration of anaesthesia mins.	75	—	—
	Return of ability to raise head. hrs.	1·75	3·0	4·75
	Recovery time hrs.	6·0	3·5	7·0
Cat 3. (3·0 kg.)	Dose mg. per kg.	28	18·8	28·5
	Duration of anaesthesia mins.	60	—	—
	Return of ability to raise head. hrs.	2·0	4·0	5·0
	Recovery time hrs.	4·25	5·5	7·0
Cat 4. (2·5 kg.)	Dose mg. per kg.	31	21·0	30·4
	Duration of anaesthesia mins.	120	—	—
	Return of ability to raise head hrs.	9·0	6·0	8·5
	Recovery time hrs.	15·0	9·0	15·0
Cat 5. (4·4 kg.)	Dose mg. per kg.	27	19·3	19·0
	Duration of anaesthesia mins.	120	—	—
	Return of ability to raise head hrs.	8·5	4·5	6·5
	Recovery time hrs.	9·0	7·0	10·0
Cat 6. (2·8 kg.)	Dose mg. per kg.	30	22·4	16·6
	Duration of anaesthesia mins.	60	—	—
	Return of ability to raise head hrs.	4·0	4·25	5·5
	Recovery time hrs.	7·25	6·75	9·0

Recovery time=Total duration of inability to stand.
Duration of anaesthesia=Time taken for return of corneal, pedal and palpebral reflex responses.

until 150 minutes after the induction of anaesthesia. In the remaining 6 cats, therefore, sufficient leptazol was given to cause a persistent return of reflex responses.

In the group of 6 cats which received effective doses of leptazol the amount required to restore reflexes varied considerably. In all cases but one the molecular ratio of leptazol to pentobarbitone sodium was greater than unity. The mean effective dose of leptazol for this group was significantly greater than an equimolecular dose ($P < 0.05$). Only one cat in this group showed a reduced recovery time compared to the control test and the recovery times of the group were not significantly different from those in the control tests.

Effect of Larger Doses of Sodium Bemegride

Since an equimolecular dose of sodium bemegride did not greatly reduce the recovery period, the effects produced by larger doses were observed in 4 cats. The results of these tests are shown in Table III.

TABLE III

EFFECT OF ADMINISTERING SODIUM BEMEGRIDE UNTIL CONVULSIONS OCCURRED. RESULTS OF TESTS ON 4 CATS ANAESTHETISED WITH SODIUM PENTOBARBITONE

Cat	Dose mg. per kg. Na pentobarbitone	Dose mg. per kg. Na bemegride	Hours recovery time	Hours difference
1	33·1	—	8·75	+2·25
	33·1	32·1	6·5	
2	26·4	—	8·5	+4·5
	26·8	27·2	4·0	
3	27·4	—	7·0	−0·5
	27·6	23·8	7·5	
4	36·0	—	6·0	−0·5
	36·4	38·8	6·5	

Recovery time = Total duration of inability to stand.

Injection of bemegride first caused a return of pedal, corneal and palpebral reflex responses, and as the injection continued, there was marked involuntary movement with intermittent muscular twitching which progressed to severe convulsive seizures. At this stage, it became impossible to continue intravenous injection as the needle could not be retained in the vein. Convulsions persisted for approximately one minute, after which fine muscular tremors continued for up to 30 minutes.

In 2 cats, an attempt was made to give a further injection of sodium bemegride one hour later. Handling of the cats gave rise to such vigorous movement, however, that it was not possible to make a satisfactory intravenous injection. None of these cats appeared to suffer any ill-effects as a result of the convulsions, and eventually recovered from the anaesthetic without any further evidence of excitement or hyperaesthesia. The recovery times of these cats were not significantly different from those of the control tests.

Discussion

The principle of using one drug to terminate the actions of another has a particular practical application in anaesthesia with non-volatile compounds. A striking example of this principle is the rapid reversal of the actions of morphine in the dog which can be brought about by the injection of nalorphine. Shaw (1955) showed that bemegride antagonised the actions of barbiturates, and suggested that this antagonism was specific. Recent work has shown, however, that the actions of other depressants of the central nervous system are also antagonised by bemegride (Frey *et al.*, 1956; Sanford & Wilson, 1957).

Macfarlane and Bentley (1957) have studied the action of bemegride in the dog and cat. They found that, in animals anaesthetised with pentobarbitone, the injection of 15 mg. per kg. of bemegride 45 minutes after induction of anaesthesia, caused an immediate lightening of anaesthesia, but did not

reduce the recovery time significantly. In the present investigation, the analeptic action of bemegride has been compared with that of leptazol in cats. The analeptic was given after 15 minutes of anaesthesia, when the pentobarbitone was exerting its maximum effect. By this method, a dose of 21 mg. per kg. approx. of bemegride was required to produce a return of reflex responses. This dose was greater than that used by Macfarlane and Bentley who administered the bemegride after a much longer period of anaesthesia.

Bemegride was more active than leptazol when the two drugs were compared in equimolecular doses, but their actions in cats anaesthetised with pentobarbitone were essentially similar. This similarity in action has been confirmed by observations in mice (Sanford & Wilson, 1957). Although sodium bemegride did cause a significant reduction in the recovery period, this reduction (1¾ hours approximately) is not sufficient to be of much practical value. It must, therefore, be concluded that injection of a single dose of an analeptic to hasten recovery is not a useful routine procedure in cats anaesthetised with barbiturates. Increased doses of bemegride gave rise to convulsions without producing any marked change in the length of the recovery period. For surgical procedures of short duration where rapid recovery is desired, it would be preferable to use a short-acting barbiturate, rather than to attempt to reduce the duration of action of pentobarbitone.

Cats which have been given an overdose of pentobarbitone may, however, be usefully treated by the injection of sodium bemegride to cause a return of reflex responses. The results of the present experiments indicate that a dose of sodium bemegride approximately 7/10 of the dose of pentobarbitone should be effective in most cases. It is suggested, however, that sodium bemegride should be given by slow intravenous injection until the desired effect is obtained.

Acknowledgments.—I wish to express my thanks to Professor A. Wilson for his helpful criticism of this work and to Mr. R. E. Ablett for information concerning bemegride.

Supplies of bemegride and sodium bemegride were given by Nicholas Products Ltd., to whom I am most grateful.

References

FREY, M. H., HUSHAHN, E. W., & SOEHRING, K. (1956). *Arzneimittel—Forsch.* **10.** 583.

MACFARLANE, A. W., & BENTLEY, G. A. (1957). *Vet. Rec.* **69.** 304.

SANFORD, J., & WILSON, C. W. M. (1957). Unpublished observation.

SHAW, F. H., SIMON, S. E., CASS, N., SHULMAN, A., ANSTEE, J. R., & NELSON, E. B. (1954). *Nature.* **174.** 402.

———. (1955). *Medical J. Aust.* **2.** 889.

WRIGHT, J. G. (1952). "Veterinary Anaesthesia." 3rd Edition. Baillière, Tindall & Cox, London.

Fifty Years Ago

Fees and Fellows

"The Bill (said Mr. Rutherford, addressing the Council of the R.C.V.S.) had its origin in the laudable desire of this College to be in a better financial position than it is in at the present moment. No one will deny that that is the most laudable ambition. None of you would be worse off with £2,000 or £3,000 extra besides what you make, and neither will this Council be. There are those in the north who are entirely in favour of this Council getting as much money as it requires, and I am one of those who from the very first have been favourable that this Council should get all the money it wants. I have hosts of friends in Scotland who are quite willing also to subscribe whatever is required, but they do ask, and I ask not in their name only, but in mine, that we should have a little idea of what this money is to be used for. I can well understand how I should use £2,000 or £3,000 for the first year I had it, but if it was to go on accumulating year after year I should begin to wonder how I was going to dispose of it, and I am afraid I might get into ways of spending money which were not quite desirable. However, I daresay this Council could spend £2,000 or £3,000, probably £10,000 if it gets the opportunity, but it has not shown that there is any actual necessity for the money, at least I hold so. In the face of the fact that this Council—I said this in Edinburgh the other day—can afford to buy consols and pay large bills for one thing and another, it cannot be said it is in a condition of impecuniosity, and so long as it is not in a condition of impecuniosity there is not the same outstanding necessity for being so hurried in the matter of pushing forward this Bill. I wish it to be distinctly understood that both myself and my friends —and they are many—who think with me, are entirely in favour of the Bill, but we say 'Do not for goodness sake be so indistinct in saying what you want the money for.' There are certain things, for instance, which I do not think you would ever get Scotch consent for, and others that I think you would get readily. What we do object to in Scotland is this: we object to being penalised. I hold—and I defy you to state the contrary—that it is the first duty of every member of Council to protect the privileges of the members of the profession. The dearest privilege which they possess is the right to practise their profession quietly, so long as they do not offend the laws of this country and the laws that govern this College . . . .

"You must bear in mind the fact that every member of the profession, the moment he signs the Register, which I have seen many hundreds sign, at once gets conferred upon him all the benefits of being a member of the College, and the one which he most rightly prizes is the right to be registered and not to pay any fee . . . .

"I am going to ask a question. It occurs to me as being a very curious fact that the Fellows are entirely left out of this Bill. The Fellows have a separate registration, a separate diploma, and it is my opinion,

(*Concluded in col. 1 overleaf*)

Current Literature

BOOK REVIEWS

Sheep Husbandry and Diseases. By Dr. ALLAN FRASER and Dr. JOHN T. STAMP. Pp. 444. 93 illustrations. 3rd Edition. C. Lockwood and Co. Ltd., London. 35s.

This is the third edition of the book by Dr. Allan Fraser and differs from the previous two mainly in respect of the contribution by Dr. John Stamp, Director, A.D.R.A., Moredun, on the veterinary aspects of the subject.

In his foreword to this edition, the problem facing the authors of such a publication, aimed as it is at the practical sheep breeder and not purporting to be specifically a scientific text-book, is posed by Dr. John Hammond. "One of the difficulties of applying science to agriculture is that of finding a man who is thoroughly conversant with both the practical and the scientific sides of the subject, so that the two can be interwoven. Dr. Allan Fraser is such a man, and this book brings under one cover and integrates the latest scientific advances with sound practical knowledge."

The book is divided logically into 2 main parts —Sheep Husbandry and Sheep Diseases. It is also liberally illustrated. The first part, written by Dr. Fraser, has 7 chapters, describing breeds of sheep, breeding methods, physiology, nutrition and hill and lowland husbandry. This part is written in a very easy conversational style, with a host of relevant facts, some anecdotes and a great deal of sound comment, based obviously on personal experience and acute observation. Throughout the text Dr. Fraser does not attempt to hide his high regard and very real affection for the Blackface breed of sheep, but at the same time gives a very comprehensive review of all breeds for every purpose and climate. Possibly the most rewarding chapters by Dr. Fraser are those on hill and lowland husbandry —an addition since the previous edition. The author manages most skilfully to maintain his balance between two stools—one, the risk of being too scientific and detached, the other, the danger of becoming too elementary and patronising. Altogether there is a great fund of thoroughly useful information for all interested in sheep as a species, whether one's interest be practical, academic or clinical.

What Dr. Fraser calls the most important alteration in the newest edition, is the second section consisting of 5 chapters on "Diseases of Sheep," by Dr. John Stamp. As a practising veterinary surgeon, one's approach to these chapters written primarily for the layman, is somewhat guarded and apprehensive. We are only too familiar with the writings of some of our colleagues in the farming Press and elsewhere and their distinctly "do it yourself" outlook. It is therefore gratifying to be able to record that Dr. Stamp's contribution has the virtues of sincerity, brevity and dignity, in spite of being deliberately elementary and comprehensive.

It is certain that all veterinary surgeons could read this section with considerable gain in accurate knowledge of what is a somewhat neglected aspect of our work. Dr. Stamp is to be congratulated on the success with which he has performed the onerous task of compressing and simplifying his specialised subject and presenting it in a form at once easily understood, up to date and concise. One feels that he is not responsible for the somewhat "Boy's Own" character of the illustration of "Internal Sheep Parasites." The only other mechanical flaw in this edition is a reference in the first paragraph to "the map on the inside cover of this book." No map is to be found. One rather important omission from the text is any reference to the use of hormone implants—a practice causing considerable public and scientific controversy and one very much on the increase.

This publication is a very sound book of reference, particularly for sheep breeders and farmers, and one which can confidently be recommended to veterinary surgeons and students, bearing in mind that its encyclopaedic nature, of necessity makes it a means of inspiring interest in the subject matter, rather than a complete scientific exposition of all aspects of sheep husbandry and disease.

Talking About Dogs. By OLWEN GWYNNE-JONES. Faber & Faber, London. 12s. 6d.

Olwen Gwynne-Jones, who is a dog breeder of some experience, has here written a book for the kennel keeper, whether of boarding or more particularly breeding kennels.

Her style throughout is conversational and she manages to convey a remarkable amount of information in very readable form.

Her chapter headings go through the whole gamut of kennel routine and associated problems.

Buildings, hygiene, runs, whelpings, fosters, stud dogs, feeding, heredity, fashion, judging, and finally veterinary surgeons, are all dealt with in turn.

Members of the veterinary profession come in for some "candid friend" type of criticism in various parts of this book, particularly in its final chapter, and they may, if the cap fits, feel flattered, irritated, or mildly amused as the case may be.

In general the substance of the book is sound and its descriptions (for example that of the digestive process in the dog) are graphic and readily understood by the layman.

There are a few misleading or inaccurate remarks

Fifty Years Ago—*Concluded.*

subject to a legal decision from a very good authority, that you might take away a member's privileges but you could not take away a Fellow's privileges. You may deprive a man of his right to practise as a member; can you deprive him of his right to practise as a Fellow? If you cannot, it is a serious matter, and it is evidence of the fact that the Bill has been hurriedly prepared, seeing that there is no mention all through the Bill of the Fellows."

such as the unqualified statement that "the non-poisonous varieties of disinfectant are only deodorants and have no effect on bacteria"; but these are minor blemishes and most owners of one or more dogs could derive both stimulation and help from this book provided always that their veterinary surgeon is willing to cope with the effect Miss Gwynne-Jones may have upon his previously docile clients!

Immunology and Serology. By PHILIP L. CARPENTER. W. B. Saunders Co., Ltd., Philadelphia and London, 1956. 45s. 6d.

In 350 pages the author achieves with great success the difficult task of presenting an elementary, really sound and yet interesting account of most aspects of immunology of immediate concern to medical and veterinary students.

The material is arranged so that there is a logical development of ideas—2 introductory chapters followed by chapters on Antigens, Serum Proteins, Production of Antibody, Antigen-antibody Reaction, Precipitation, Agglutination, Isohaemoagglutination, Toxins and Antitoxins—leading on to chapters on Phagocytosis, Cytolysis and Complement Fixation, Antiviral Immunity, and Allergy.

The great merit of the book is the clear way in which the subject is presented. Aspects of immunology which often cause difficulty to students such as methods of toxin and antitoxin titration are made clear by illustrative practical examples. With most phenomena the student is first made acquainted with the laboratory test and subsequently the theory underlying the phenomenon is discussed. Not even the chapter on allergy is allowed to mystify the student by abstruse terminology.

The danger of such a clear, precise, and elementary text-book is that the student might get the impression that all is cut and dried and that the frontiers of the subject have nowhere further to expand. However, there is time to rectify this impression in early post-graduate years.

Notwithstanding the general excellence of the book, the discussion on Marrack's lattice hypothesis and Burnet's adaptive enzyme theory for antibody production are not in the reviewer's opinion so clearly presented and the chapter on Cytolysis and Complement Fixation is one of the least engaging. Recent work in this field should do much to remedy this in future editions. Two statements on p. 249 should be altered. It was 1910, not 1929, that Streng first adapted the conglutination reaction as a complement fixation test and Hole and Coombs were by no means the first to employ this adapted complement fixation test diagnostically for glanders in horses. Many workers used it in the decade 1910-20.

Other very minor inaccuracies which may be criticised are: (p. 49) antibodies in the serum of patients with infectious mononucleosis although reacting with ox red cells do not agglutinate them; (p. 92) a reference number 65 is given and there is no such reference at the end of the chapter; (p. 127) the difference in the mechanism of the adsorption of polysaccaride and protein on to red cells is not made clear, and it seems a pity that the coated, tanned, red-cell technique of Boyden's is not mentioned as the method is now coming into such general laboratory practice; (p. 187) surely not all reactions between proteins and formaldehyde are reversible!

In conclusion this book can be thoroughly recommended as an elementary text-book for medical and veterinary students taking their immunology course. The references given are well selected between the classical literature and the modern and give the student the opportunity of consulting original sources. The appendix on laboratory experiments will be helpful for students and teachers alike.

Bergey's Manual of Determinative Bacteriology. By ROBERT S. BREED, E. G. D. MURRAY, and NATHAN R. SMITH. 7th ed. Pp. xviii + 1,094. Baillière, Tindall & Cox, London, 1957. 120s.

"Bergey's Manual of Determinative Bacteriology" has reached its 7th edition since 1923. The editors, R. S. Breed, E. G. D. Murray, and N. R. Smith were assisted by 94 contributors. R. S. Breed was Chairman of the Board of Trustees and Editor-in-Chief of the Manual; he died in 1956 and at the time of his death most of the manuscript was in the hands of the publishers. R. E. Buchanan has served as Chairman of the Board of Trustees in place of the late Dr. Breed.

This edition differs little from its immediate predecessor in so far as its main content is concerned. The classification of the bacteria and their descriptions together wth appropriate keys are given as before. Another volume, to be known as "Index Bergeyana," will contain accounts of those species which have been inadequately described and those which cannot be defined satisfactorily. This latter will also include the host and habitat index as well as an index to the literature on the accepted and the poorly described organisms. The Manual itself has these slight changes with descriptions of many more species and the descriptions are more adequate than in former editions; much material of historical value has been omitted and the Manual is now more convenient in size than hitherto.

The 6th edition contained a section in which the viruses were named and classified; this attempt was thought to be premature by many virologists and after some consultations it was decided not to include it in this, the 7th edition.

The volume remains as a valuable aid for the experienced microbiologist. There are chapters on the use of the Manual, the methods of classification, and details on how bacteria are named and identified. The greater part gives the details of the known species of bacteria and they are defined according to the division, class, order, family, and genus to which they belong. The suggestions made for using "Bergey" for classifying unknown organisms should be studied and adopted. The considerations which influenced the classification used in the Manual should be examined and the methods utilised for naming bacteria will help the intelligent use of the main part of the Manual. A key which enables one to determine whether any isolated organism bears any resemblance to an organism described in the Manual and an index of scientific names completes the 1,094 pages.

News and Comment

HONORARY M.Sc. DEGREE CONFERRED ON MR. HENRY SUMNER

At a ceremony of the University of Liverpool, held on July 4th, Mr. Henry Sumner, Treasurer and past President of the Royal College of Veterinary Surgeons, was one of three honorary graduates of the University. The other two were the President of the Royal College of Surgeons of Edinburgh, Sir Walter Mercer, who was awarded the degree of Master of Orthopaedic Surgery, and the City Engineer of Liverpool, Mr. H. T. Hough, who received the degree of Master of Engineering.

The Public Orator, in presenting Mr. Sumner to the Chancellor, recalled the service of the Sumner family as veterinary surgeons to the City of Liverpool in unbroken continuity of over 150 years. He recalled the service Mr. Sumner's father had done in laying the foundation of the Liverpool Veterinary School, and the work which Mr. Sumner himself had done for the School. The Public Orator then turned to the wider aspects of Mr. Sumner's work both as an office holder of the College, and as Chairman of the Visitors to the Universities in Great Britain and the Republic of Ireland.

After the Degree Ceremony, Mr. Sumner, on behalf of the President of the Royal College, admitted the new veterinary graduates of the University to membership of the College. He was later in the evening a guest at a dinner held by the University.

THE ROYAL ARMY VETERINARY CORPS

The Queen has been graciously pleased to approve that the following be mentioned in recognition of gallant and distinguished service in Cyprus for the period of July 1st to December 31st, 1957:—

Royal Army Veterinary Corps, Lt.-Col. D. F. G. Smith, O.B.E. (62249).

THE AGRICULTURAL RESEARCH COUNCIL

The Duke of Northumberland has now taken up his appointment as chairman of the Agricultural Research Council in succession to Lord Rothschild, G.M., F.R.S., who retired on June 30th, 1958, after ten years' service as chairman.

THE NUTRITION SOCIETY

At a recent meeting Miss A. M. Copping, Dr. A. W. Stableforth, Miss B. R. Stanton, and Professor A. W. Woodruff were elected Ordinary members of Council. Dr. R. J. L. Allen (c/o Beecham Foods Ltd., Brentford, Middlesex) is hon. secretary.

Honorary membership of the Society has been conferred on Professor Dr. B. C. P. Jansen, lately Director of the Nederlands Instituut voor Volksvoeding, in recognition of his distinguished contributions to nutritional science. The other honorary members of the Society are Lord Boyd Orr, F.R.S., Dame Harriette Chick, D.B.E., Professor E. V. McCollum, and Major-General Sir Robert McCarrison.

R.V.C. ASSOCIATION ANNUAL DINNER

Old students of the Royal Veterinary College gathered together on June 6th for their third annual reunion and dinner. The guest of honour was Mr. Lionel Stroud.

After the loyal toast had been honoured, the President, Professor McCunn, gave a review of the progress of the Association during the past year. He said that the membership was increasing steadily and he asked all present to do their utmost to get new members. The finances of the Association were in a healthy state and they had been able to invest some of the accrued capital. This was a first step towards the goal of building up a capital fund from which the income could be used to help old "Londoners" who might be in need. They would remember that Mr. Stroud gave him a silver medal which had been awarded to all students in attendance at the College in the centenary year 1891. Mr. Stroud was one of these students. He, the President, thought that this link with the past should not be hidden away in a drawer but might serve as the President's badge of office. A suitable mounting had been made and he hoped that at their next meeting it would be worn by the President.

Mr. Stroud, who was received with acclamation, thanked the members for inviting him to their annual dinner. He was pleased that there was an old students' association and he felt greatly honoured to be their guest. He was delighted that his medal was now the centrepiece of their President's badge of office. He related many tales of Sir George Brown ("Dismal Jimmy") who, when he was dressed to go to Buckingham Palace to receive the accolade, was seen sitting in his office grilling a large steak on a fork before the open fire. Other great "characters" from the past were also vividly recalled, and then Mr. Stroud described the great banquet of 1891 when a champagne lunch was given to a distinguished gathering in a gas-lit marquee erected in the large quadrangle. The students raided the champagne and had a good time much to the amusement of the Prince of Wales who was the principal guest.

The President of the Students' Union gave his report on the students' activities in the 1957-8 session. Their prowess in sport was not up to recent standards, but in the first year there were many who gave promise for the future. He said how pleased everyone had been to hear Mr. Stroud's talk of life in the old College; there was evidently more laughter in those days, and he was sure that life and learning were all the better for a little spice of fun.

The company then adjourned to another room where Mr. E. F. Lewis presented films of activities, over the last twenty years, at Sonning and Streatley. It is hoped that a fully edited version of this film will provide an attractive feature at the next dinner.

THE ROYAL VETERINARY COLLEGE

The Division of Preventive Medicine will shortly move to the new field station. On and after July 21st, 1958, all blood samples, milk samples, etc., and orders for Mallein should be sent to Hawkshead House, Hawkshead Lane, North Mimms, Hatfield, Herts. The Division will not be able to supply tuberculin after July 31st, 1958.

UNIVERSITY NEWS

Cambridge

The Wellcome Foundation are providing a prize to consist of books to the value of £20 for presentation to a student reading for the Vet.M.B. degree at Cambridge who has done the best work in Animal Pathology. The first award will be made in December, 1958.

Edinburgh

The undermentioned candidates have passed the Final Professional Examination for the degree of Bachelor of Veterinary Medicine and Surgery:—

Archbold, William Alexander Carson; Brown, Charles George Duncan; Clark, William Towler; Craigie, Elisabeth Cynthia; Fraser, Daniel McKenzie; Grigor, John Alasdair; Heywood, Ralph; Hudson, Geoffrey Brian; Jackson, Jane Marie Theresa; Kennedy, Andrew Stewart; Kinch, David Alan; Leek, Barry Frank; McCabe, David Watson McDonald; MacKenzie, Peter Kenneth Ian; Macnab, Peter Jeffrey; Mitchell, Benjamin; Needham, Ernest James; Nutt, Peter; Rennie, Lessel John Charles; Rogers, Elizabeth Marion; Taylor, Betsy Rae; Thomson, James Whitehead; White, Roy Owen; and Wright, Iain George Anderson.

IN PARLIAMENT

SIR W. ANSTRUTHER-GRAY asked the Minister of Agriculture what progress had been made in his negotiations with regard to the ban on British livestock imports into Australia.

MR. GODBER replied that the matter had been fully discussed with the Australian authorities who had said that their decision was taken only after most careful consideration and that the need for the ban would be kept under review. In answer to a second question he said the Australian authorities had been left in no doubt about the British view.

COLONEL BEAMISH on the same day asked the Minister to what extent a study had been made of reports of the effects upon wild life of chemicals used in agriculture in other countries.

MR. GODBER replied that such reports were studied but that the Nature Conservancy was not aware of any up-to-date evidence from this country to prove that such chemicals were causing any important or widespread reduction in the bird or mammal population.

COLONEL BEAMISH said there was considerable evidence to show that many thousands of wild birds were being killed every year as a result of the use of toxic chemicals in agriculture.

SIR G. NICHOLSON hoped that the damage done to insect life, a wide range of which was beneficial to agriculture, would not be overlooked.

MR. GODBER, in reply, said there was a wide general oversight of chemicals used in agriculture.

Argentine Meat (Foot-and-Mouth Disease)

MR. HURD (July 10th) asked the Minister of Agriculture, Fisheries and Food if he has now received assurances from the Argentine Government that measures are being taken to tighten up the precautions to prevent foot-and-mouth disease infection reaching this country through chilled and frozen meat shipped from Argentina; and what action the Food and Agriculture Organisation of the United Nations is taking to assist the South American countries in clearing up the disease.

THE MINISTER OF AGRICULTURE, FISHERIES AND FOOD (MR. JOHN HARE): We are constantly reminding the Argentine Government of our concern about foot-and-mouth disease, and I am advised that the Argentine authorities are co-operating fully in the operation of precautionary measures which have recently been strengthened. The fifth session of the European Commission for the Control of Foot-and-Mouth Disease, which met in April of this year, discussed the extent to which outbreaks of this disease in Europe might be attributable to imported South American meat. Following this, the Food and Agriculture Organisation invited my Chief Veterinary Officer to accompany the chief of their Animal Production Branch on a visit to South American countries. They have just concluded their visit to the Argentine. Their purpose is to study and report upon the situation generally, and, in particular, upon the control measures which are being pursued. I welcome F.A.O.'s initiative in this matter, which, I hope, will be of benefit both to South American and European countries and ourselves, in particular.

A VETERINARY PIONEER

His friends in this country will be interested to read the following note on Mr. P. Builder, which was published in the June issue of *Veterinary News*, issued by the Alberta Veterinary Association:—

Dr. Peter Builder of Prince George, B.C., has fashioned a mobile Veterinary Hospital in which he plans to serve the vast Cariboo country in the Northern Interior of B.C. His route will take him to Quesnel, south of Prince George, and also far west right out to Prince Rupert on the coast. His hospital is equipped with surgery, kennels for six animals, kitchen, shower, oil heater, propane stove, and even a hi-fi set. It is reported that the initial cost is high as he must be prepared to cover some pretty tough roads.

THE ROYAL COUNTIES VETERINARY ASSOCIATION

The Royal Counties Veterinary Association held a residential refresher course at Reading University from July 11th to 13th, inclusive. The course was devoted to a consideration of pig diseases and was attended by 18 veterinary surgeons. Mr. J. T. Done and Mr. J. D. J. Harding of Weybridge, and Mr. A. MacKenzie of Compton, acted as discussion leaders.

The course was largely in the nature of an experiment but proved so successful that further such courses are likely.

VETERINARIANS AT RESEARCH FARM

More than 40 veterinary teachers and research workers visited the Greenford headquarters and the Harefield Research Farm of Glaxo Laboratories Ltd. on July 11th. The party was welcomed by Dr. F. J. Wilkins and taken to the company's Research Farm where they were shown the breeding facilities and the general lay-out of the Farm, including the isolation compound.

After being entertained to lunch, the visitors returned to the Greenford headquarters where demonstrations of veterinary interest were seen. Before leaving they were shown the facilities for the manufacture of veterinary vaccines and animal feedstuffs.

THE HAMPSHIRE CATTLE BREEDERS' SOCIETY

At the annual general meeting held on June 24th, the chairman, Mr. G. N. Gould, raised a number of points interesting to veterinary surgeons generally. In the course of his remarks he said:—

"We expect to make further progress with pig A.I., which will warrant the building of a permanent pig unit on the Lyndhurst site. We are at present experimenting with types of flooring suitable for boars. Having reached the point when the pig conception rate has reached 50 to 55 per cent.—as a result of the patient work of our veterinary surgeon, Mr. Madden, the adoption of the Norwegian technique, the fuller co-operation of pig breeders in recognising the optimal period of heat for insemination, and the skill of our inseminators—we have great faith in the future: 634 first inseminations were done in 1956, 1,147 in 1957, and we have now reached 145 per month—on a gradually increasing demand. Greater numbers will give greater significance to the improved conception rates recorded. Litter sizes are normal.

"We would impress upon the authorities concerned how valuable would be the exploitation of progeny-tested boars through A.I. and ask for their co-operation in the provision of such boars. The P.I.D.A., the National Progeny Testing Board, and the Breed Societies might well remember this when deciding on measures of support which they propose for the industry in the future.

"As a measure of our confidence we are in process of increasing our boar stud to eight to permit fresh semen to be available daily from both Large Whites and Landrace.

"A new venture is the introduction of the beef Shorthorn bull 'Basildon Affluence' which enquiry confirms is the best beef-crossing bull for Ayrshires. We prefer the use of this established British breed with the known experience of its value in crossing with Ayrshires for beef to possible experimentation with the Charollais.

"The ban on the export of British cattle and semen to Australia is regrettable, particularly as it appears to be founded on disease risks which are non-existent as far as Great Britain is concerned. We had most satisfactory experimental use of deep-freeze semen in Queensland, Australia, at a conception rate of 71 per cent., which we had hoped to repeat. We shall, however, have the opportunity of experimental export to British Guiana as a result of arrangements made between the Minister of Natural Resources, the Hon. Edward Bahary, and myself, during my recent Caribbean tour. This will be a contribution to the sorely needed herd improvement in that country and gives us further experience of world-wide transport of semen. It may well pave the way for export of British bulls, owing to the limitations imposed by the terrain and the system of agriculture, on the application of artificial insemination generally in that country."

PERSONAL

Mr. W. J. Brinley Morgan, B.V.SC., M.R.C.V.S., DIP. BACT., has been awarded the degree of Ph.D. at the University of Reading. The subject of the Thesis was "Studies on *Vibrio fetus*."

Births

BROWN.—On July 8th, 1958, to Joy, wife of David R. Brown, B.V.M.S., M.R.C.V.S., at Morpeth, Northumberland, a son, Graham Stuart, a brother for Claire.

HOPES.—On June 17th, 1958, at Kampala, to Sheila, wife of Raymond Hopes, B.V.M.S., M.R.C.V.S., a son.

LLOYD.—On July 12th, at Trumps Barn, Cullompton, Devon, to Anne, wife of Trevor Lloyd, B.V.SC., M.R.C.V.S., a son, brother for Wendy.

PHILLIPS.—On July 4th, 1958, at Edinburgh, to Margaret, wife of J. E. Phillips, a daughter.

TAYLOR.—On July 2nd, 1958, at St. Margarets, Twickenham, to Ruth (*née* McLelland), M.R.C.V.S., wife of W. M. Taylor, M.R.C.V.S., a son.

Marriages

CRABTREE—THOMPSON.—On July 12th, 1958, at the Church of St. Michael and All Angels, Cottingley, Bradford, George Edward Crabtree, M.R.C.V.S., of Keighley, Yorks, to Patricia Anne Thompson of Sandy Lane, Bradford, Yorks; future address: Bank House, Braithwaite, Keighley.

STEINBORN—HUGHES.—At the Registry Office, Coleshill, Warwickshire, Hildegard Emma Steinborn, only child of Wilhelm and Agnes Steinborn of Wernigrode, East Germany, to Ivor Hughes, Veterinary Practitioner, of "Honeysuckle Cottage," Coleshill, by special licence, Monday, July 14th, 1958.

COMING EVENTS

September

17th (Wed.). Meeting of the North Wales Division at Glynllifon, Caernarvon.

21st to 26th (Official Opening, Monday, September 22nd). 76th Annual Congress of the British Veterinary Association in Douglas, Isle of Man.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Ches. Marsh Lane Farm, Edleston, Nantwich (July 7).

Dorset. Manor Farm, Charlton, Donhead St. Mary, Shaftesbury (July 7).
Hants. The Knackery, Andover Down Farm, Andover (July 9).

Fowl Pest

Cambs. 9, Church Street, March; 11, Jobs Lane and The Orchard, Town End, March (July 7).
Norfolk. Pump Farm, Carleton Rode, Norwich (July 4); Sundial Farm, Bunwell, Norwich (July 7); Manor Farm, Stoke Ferry, King's Lynn; 286, St. Faiths Road, Old Catton, Norwich (July 8); The Street, Bunwell, Norwich (July 9).

Swine Fever

Bucks. Home Farm, Middle Green, Langley, Slough (July 8).
Ches. Brookhouse Farm, Withington, Macclesfield (July 7).
Denbigh. Bodeuron Farm, Llanarmon Road, Bwlchgwyn, Wrecham (July 9).
Essex. Rouses Farm, Stoke by Nayland, Colchester (July 7).
Glos. Davids Lane Farm, Alveston, Bristol; Rock Villa, Ruardean Woodside, Ruardean (July 7); Albercott Cottage, Itchington, Alventon, Bristol; Maules Nurseries, Hambrook, Bristol; The Nursery, Church Road, Rudgeway, Bristol (July 8).
Lancs. Elms Farm, Whitefield, Manchester (July 7).
Leics. Burbage House Farm, Lutterworth Road, Burbage, Hinckley (July 7).
Middx. Lower Priory Farm, Clamp Hill, Stanmore (July 7).
Norfolk. Ruggs Hall Farm, Felmingham, North Walsham (July 9); Goswells Farm, Hepworth, Diss (July 10).
Northants. 32, Thrift Street, Irchester, Wellingborough (July 4).
Shrops. The Fields, Treflach, Oswestry (July 7); Oakwood, Walford, Baschurch, Shrewsbury (July 8).
Somerset. Manor Farm, Stanton Prior, Bath (July 9).
Staffs. Scarborough Farm, Etching Hill, Rugeley (July 8).
Suffolk. Brittons Farm, Somerton, Bury St. Edmunds (July 8); Braisworth Hall, Tannington, Woodbridge (July 9); Woods Stores, Bacton, Stowmarket (July 10).
Sussex. Cinders Lane Nurseries, Yapton, Arundel (July 7); Hobbs Barton Farm, Framfield, Uckfield; No. 25, Smallholding, Victoria Drive, Eastbourne (July 8).
Warwicks. 68, High Street, Solihull Lodge, Shirley, Solihull (July 7); Old Manor Farm, Princethorpe, Rugby; Piggeries, Harpitts Fields, Princethorpe, Rugby (July 8).
Wilts. Scotts Farm, Pinkney, Malmesbury (July 10).
Yorks. Croom House Farm, Sledmere, Driffield (July 9).

Letters to the Editor

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

GENERAL

The Pathogenicity of *Vibrio fetus*

Sir,—I have been asked to comment on the statistical aspects of the results reviewed in "The Pathogenicity of *Vibrio fetus*" (*Vet. Rec.*, May 10th, 1958). Although several of the variables discussed could be analysed statistically if detailed results were given, the information presented in fact permits only the analysis of the effect of *V. fetus* on the number of services per conception. Information on this subject can be obtained from Tables III to X, and it appears reasonable to combine these results in a single test. Apart from the results in Table III, in which the "number of services per conception" is clearly computed in a different way from that in the later Tables, I have accepted all the results at their face value, assuming that the various authors quoted have all used this term with the same meaning. This variable is not suitable for statistical analysis without some transformation; I used the logarithmic transformation, and this had the desired effect of making approximately equal the variability in the infected and non-infected groups. I compared the mean transformed values for the two groups in a *t*-test and obtained a value of 11.4 on 28° of freedom; this showed that the difference between the two groups was very highly significant ($P << 0.001$). I take this as convincing evidence of the effect of *V. fetus* in producing lowered fertility.

The results relating to the effect of antibiotics have already received some analysis, and little is to be gained from attempting a combined test. I would like to point out that the X^2 test used by the Reading workers requires very stringent distributional conditions for its valid use, and whilst the details given in the review do not make it possible to judge whether these conditions were satisfied in this case, I have in fact rarely found cases where the test can safely be used. The procedures to be applied if the test is not valid are discussed in statistical literature.

Yours faithfully,
R. C. CAMPBELL.

Agricultural Research Council,
Statistics Group,
School of Agriculture,
Cambridge.
July 11th, 1958.

Panaritium in Hounds

Sir,—This condition of inflammation of the claw, with subsequent infection of the matrix resulting in destruction of tissue and separation of the nail, is one which had persisted for many years in a pack of hounds. The predisposing factors are unknown. Some authorities consider that lack of sufficient exercise is the main reason, whilst others think the reverse in that the claws are often worn down to the matrix and thereby allow infection to enter. Fresh hounds, free from the condition when imported into the kennels, took 3 to 6 months to show evidence of the disease. It started as a dark brown discoloration underneath part of a nail at its root and gradually spread down the whole length. Some time elapsed before degeneration of the matrix occurred, and only then was there sign of pain in the animal. The nail grew much longer than the others and looked more like the beak of a bird. As it separated from the matrix, a dark brown, waxy material was found filling the intervening space. The nail broke off, leaving a

raw, painful matrix. The infection usually spread to the joint, which became enlarged, painful, and the cause of chronic lameness. As a rule, only one toe was affected to this chronic stage, but often there were several or all of the other toes showing the brown discoloration in varying degrees.

Bacteriological examination of matrix and the waxy material showed the presence of the following organisms: betahaemolytic streptococci, *Staphylococcus albus*, *Bacterium coli*, and two spore bearers of the subtilis group; but no sign of actinomycetes, which are often associated with "foot-rot" conditions. All 5 of the organisms were sensitive to streptomycin, terramycin, and chloramphenicol; and as the last-named drug was readily available in the form of a 10 per cent. solution with gentian violet, it was decided to experiment with it.

In chronic cases, with thickened joints, the only remedy was removal of the affected part by surgical means. This resulted in a complete cure of the lameness as soon as healing was finished. In those cases where the nail was beginning to separate from the matrix, the treatment involved the removal of the nail and dressing the raw area with chloramphenicol and leaving the bandaged paw undisturbed for as long as 7 days. Sometimes a second dressing was necessary; but mostly, the paw could be left uncovered and the hound was not bothered about it. Lameness had disappeared by about the tenth day.

Where there was no separation of the nail, but the brown area traversed its length, it was possible to remove some of the waxy material from the under surface of the claw and dress with the drug. This had to be repeated several times and was effective in only a few cases. Greater benefit appeared to be derived from the application of the dressing around the root of the claw.

Various remedies were tried in an attempt to prevent the disease. A foot-bath containing dilute formalin was placed at the entrance to the kennels; but this created such antagonism to entering and took so many men to enforce, that it was abandoned. Another method, whereby the hounds were collected in a small yard and their paws sprayed with water, met with a certain amount of success, due mainly to the necessity of the hounds to lick their paws in order to dry them and thereby clean them. Much greater success has attended an improvement on this method. Prior to the hounds entering the small yard, its floor is sprinkled with "agricultural salt." Contact with this salt so irritates the paws that the cleaning process is very much prolonged. The salt does not injure the paws in any way and the result is most beneficial. So much so, that now, 12 months after starting this method, there are no lame hounds in the kennels. Any suspicious cases are treated with chloramphenicol, but this is now a rare occurrence.

Yours faithfully,
R. W. L. CHESNEY.

16, The Parks,
Minehead,
Somerset.
July 3rd, 1958.

A Scale of Veterinary Fees

Sir,—In recent weeks there has been considerable correspondence regarding the possibility of a basic scale of fees. Mr. Henderson (May 24th) drew attention to the fact that, following a very vehement show of feeling on this subject at the B.S.A.V.A. Congress earlier in the year, a sub-committee was formed for the purpose of conducting a survey of fees and subsequently a list of suggested minimum charges. As a result, quite recently, a questionnaire was sent out to B.S.A.V.A. members. The response has been overwhelming and within a matter of days we have received details of fees charged (by several hundred practitioners) for small-animal work.

In view of this it seems likely that there may be quite a substantial number of practitioners outside the Association who would be willing to join the survey. I should be pleased to enlist their help if they would contact me within the next 10 days. The accuracy of the final analysis, both regional, and for the country as a whole, will naturally be proportionate to the numbers taking part, so that with the machinery set up all are welcome. In addition, would those members who have not yet returned the questionnaire please do so as soon as possible? All information given will be treated as strictly confidential.

Yours faithfully,
D. G. LEWIS.

"Hillcrest,"
1a, Weston Road,
Strood,
Kent.
July 15th, 1958.

A Defect of Veterinary Education

Sir,—I should like to offer my congratulations to Mr. R. H. A. Merlen on his letter, "A Defect of Veterinary Education," which was published in THE VETERINARY RECORD of July 12th.

It is a long letter, but rarely does it deviate from the point. To my mind it also makes very interesting reading. This is the type of mental attitude the profession needs. Here, surely, is someone who has the interests of this great profession at heart and thinks not just of what he can get from it.

Whatever one's ultimate philosophy, it is the early-sown seeds which bear fruit. If these are good, contamination is less likely to overcome them. It is up to us to attract the right type of man and woman into the profession, and, having embarked them on a course of study, to see that they learn not only facts, but right principles also.

Yours faithfully,
J. D. P. O'BRIEN.

"Endfield,"
Woodhouse,
Sheffield.
July 14th, 1958.

A Plea

Sir,—I do not think I have felt moved to write to THE RECORD on a previous occasion, but was so delighted by Mr. Miller's letter, "A Plea," in your

issue of April 26th, that I must do so now if only to thank him for drawing attention to a habit of contributors, which seems to be greatly on the increase.

To read an article or letter in THE RECORD which is written in clear, "dictionary" English, with no unnecessary verbosity and no coined words, is so rare as to be a real joy. I hope sincerely that many contributors will take Mr. Miller's letter to heart and again return to the practice of writing *good* English which can be easily understood.

Yours faithfully,
RUTH HUSSEY.

Box 223,
Clarkson,
Ontario,
Canada.
June 15th, 1958.

Veterinary Elections

Sir,—One or two recent letters on this subject prompt me to add my own contribution.

Of the list of ten candidates at the June election for five members of the R.C.V.S. Council I have met two of them on not more than two occasions, I had some knowledge of the scientific work done by two, I was not unfamiliar with the names of four and I had not heard of the remaining two

I did not know how any of them felt about such items as professional standards, animal charities, the Veterinary Surgeons' Act, unregistered practice, the business methods of drug firms, or the participation of the profession in the public health sphere, etc.

It has, I believe, been put forward by a previous correspondent that candidates should address the profession by some means. I suggest that the R.C.V.S and/or B.V.A. get down to implement the suggestion as soon as possible so that the elected members of either the Royal College or B.V.A. are more truly representative of the profession and so that we can feel they are endeavouring to pursue a policy in accordance with the wishes of the electorate. Obviously care must be taken that the election address of any candidate should be strictly confidential and circulated only to the profession.

I am, Sir,
Yours faithfully,
D. G. EARNSHAW,
Veterinary Investigation Officer, Northern Nigeria.
Hazelmont Hotel,
Gregory Boulevard,
Nottingham.
July 15th, 1958.

SCIENTIFIC

The Influence of Ovarian Hormones on Resistance to Uterine Infections*

Sir,—The failure of many attempts to transfer fertilised ova *via* the cervix in cattle stimulated an interest on the influence of ovarian hormones on the course of uterine infections. This led Rowson, Lamming, and Fry (1953), and Black *et al.* (1953) to study the problem in cattle and rabbits respectively. Both groups showed that the uterus of oestrous animals was resistant to bacterial infections while that of animals under the influence of progesterone was susceptible. Furthermore, by using ovariectomised animals, Rowson *et al.* (1953) concluded that the effect was due to a positive action whereby progesterone promotes conditions in the uterus which are conducive to infection. Hawk *et al.* (1955) have claimed that the phenomenon is localised to the uterus and proceeded to search for a special uterine defence mechanism. They have been unable to explain differences in the bactericidal action of oestrous and pseudopregnant rabbit uteri in terms of simple physiological phenomena such as uterine drainage. However, our present work has shown that drainage *via* the cervix is quite important in uterine defence.

This preliminary report reviews the work which was undertaken to investigate the possibility that various general defence mechanisms can also influence the course of uterine infections. A preliminary trial indicated that oestrous uteri are capable of rapidly reducing experimental uterine infection (*e.g.* in as little as four hours). This suggested that some property of the uterine environment is responsible for the phenomenon rather than any special defence mechanism which takes time to develop. Studies were therefore made of the effect of ovarian hormones on the bactericidal action of blood and uterine secretions. These failed to reveal any evidence to suggest that differences in the chemical environment of oestrous and progestational uteri can seriously influence bacterial growth. "*In vitro*" studies showed that there was no difference in the ability of secretions from oestrous and progestational uteri to support bacterial growth. Similarly, no difference could be demonstrated "*in vivo*" where bacteria were placed within semi-permeable sacs in the uteri of oestrous and dioestrous rabbits and cows. This indicates that the luminal fluids from uteri of both oestrous and dioestrous animals will permit the growth of similar bacterial populations if the latter are isolated within the uterus.

A consideration of the rate of uterine antibody production shows that it is far too slow to account for the differential bactericidal action of oestrous and pseudopregnant rabbit uteri, since experiments failed to detect the presence of local uterine antibodies until eight days after an experimental immunisation. The importance of these uterine antibodies in controlling subsequent uterine infections was then assessed where animals were immunised either by the systemic or intra-uterine routes. The results obtained showed that it is possible to increase slightly the antibacterial activity of both oestrous and pseudopregnant uteri by intra-uterine immunisation but not by systemic immunisation. This seems to be of little practical importance because immunised progestational uteri still appear to be incapable of dealing effectively with infections to prevent the development of pyometritis. Immunised animals with uterine infections have to be returned to the oestrous condition completely to eliminate the infection. It is possible, however, that uterine immunisation may be useful in helping to

* Abstract of thesis presented by A. W. J. Broome for the degree of Ph.D., University of Nottingham, June, 1958.

control the few special bacteria which appear able to survive within the oestrous uterus, *i.e. Vibrio fetus*.

Further experiments have shown that the reticulo-endothelial system probably plays an important rôle in uterine defence. The reticulo-endothelial cells are mobilised much quicker in the oestrous uterus than in the dioestrous uterus and this is reflected by greater leucocyte infiltration at 4 and 8 hours after an experimental infection in oestrous animals. The appearance of these leucocytes coupled with the simultaneous disappearance of bacteria suggests that the leucocytes are probably responsible for the defence of the oestrous uterus. Examination of the number of leucocytes present, and the number of bacteria removed showed sufficient leucocytes are present to account for the removal of bacteria. The accumulation of pus to form a typical pyometritis in the later stages of infection in progestational animals appears to be due partially to the infiltration of non-phagocytic elements of the reticulo endothelial system into the uterus.

Experiments have also been conducted to study the contribution of drainage through the cervix in the control of infections. In these experiments the cervixes of oestrous and pseudopregnant animals were ligated and their uteri infected with *Eimeria coli*. The work showed that uterine drainage plays an important part in preventing the accumulation of the products of infections. The bactericidal activity of oestrous uteri was reduced but not eliminated by ligation at both 4 and 8 hours after experimental injections.

To summarise, the luminal fluids of uteri of oestrous animals appear to be a satifactory medium for bacterial growth, providing the bacteria are isolated from the living endometrium. However, there are more phagocytic elements present in the normal oestrous uterus and they appear to be more active especially between 4 and 8 hours after experimental infections. In addition, uterine drainage in the oestrous animal will quickly remove the products of infection which tend to accumulate in animals under the influence of progesterone. It is suggested that these differences in the activity of the reticulo-endothelial system are responsible for the differential bactericidal activity of uteri of animals under the influence of oestrogen or progesterone.

It is possible that differences in the uterine environment can affect the activity of leucocytes for such factors as oxygen tension and potassium ion concentration are known to affect phagocytic activity. These aspects are now under consideration.

Yours faithfully,

A. W. J. BROOME,
G. E. LAMMING.

University of Nottingham,
School of Agriculture,
Sutton Bonington,
Nr. Loughborough,
Notts.

July 10th, 1958.

References

BLACK, W. G., SIMON, J., MCNUTT, S. H., & CASIDA, L. E. (1953). *Am. J. Vet. Res.* **14.** 318.

HAWK, H. W., SIMON, J., COHEN, H., MCNUTT, S. H., & CASIDA, L. E. (1955). *J. Am. Vet. Med. Ass.* **126.** 268.

ROWSON, L. E., LAMMING, G. E., & FRY, R. M. (1953). *Vet. Rec.* **65.** 335.

ADVERTISERS' ANNOUNCEMENTS

BURROUGHS WELLCOME & CO. announce the introduction of "Trivexin" brand Braxy, Blackleg, Pulpy Kidney Vaccine for the vaccination of sheep in areas where all three diseases are prevalent. "Trivexin" is available in bottles of 250 c.c. (50 doses).

THE CROOKES LABORATORIES LIMITED announce the introduction of a new iron injection for the prevention and treatment of piglet anaemia.

Marketed under the trade name of "Myoferrin" this new preparation provides 200 mg. of iron in each 2-ml. dose. The makers claim, after nearly three years of extensive research and field trial studies, that one injection of Myoferrin completely protects the piglet against both primary and secondary outbreaks of anaemia.

GLAXO LABORATORIES LTD. announce the introduction of Predsolan tablets (each tablet containing 1 mg. prednisolone as the acetate). This convenient dosage form is intended primarily for the small-animal practice where systemic prednisolone may be indicated in the treatment of serious burns, some skin conditions and certain alergic conditions to supplement topical therapy. The preparation can also be used in conjunction with local injections of corticosteroids for some inflammatory joint and tendon lesions. The product is now available from June 23rd and will be supplied in bottles containing 25 tablets.

THE DISTILLERS COMPANY (BIOCHEMICALS) LTD. announces the availability of "Streptaquaine" Sulpha Oral Suspension Veterinary.

A ready-prepared suspension for action against scour, this new preparation combines dihydrostreptomycin with sulphadimidine for a double-barrelled attack on bowel infections in veterinary practice. Apart from these two soluble antibacterials the suspension contains the traditional bowel absorbents and astringents, Kaolin and Pectin. Dosage is easy to administer with this liquid preparation in a 16-fluid-ounce dispensing pack.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	Atrophic Rhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 30th June, 1958		4	—	—	8	—	103
Corresponding period in	1957	5	1	—	36	—	47
	1956	15	—	1	54	—	37
	1955	17	1	—	24	—	77
1st January to 30th June, 1958		91	3	111	309	—	691
Corresponding period in	1957	227	5	24	455	—	455
	1956	1,018	6	13	323	—	387
	1955	442	1	6	271	—	848

† See Correction - p. 620 - "Escherichia Coli."